N° IX.

MODE OF COMMUNICATING WITH VESSELS STRANDED ON A LEE-SHORE.

The GOLD VULCAN MEDAL *of the Society was this Session presented to* CAPT. DANSEY, *of the Royal Artillery, for* A KITE FOR EFFECTING A COMMUNICATION BETWEEN A STRANDED SHIP AND THE SHORE. *The following Communication has been received from the Candidate, and the Apparatus has been placed in the Repository of the Society.*

SIR; Woolwich, 28th Feb. 1822.

I BEG to submit to the Society for the encouragement of Arts, &c. the outline of an expedient for facilitating communication with vessels stranded on a lee-shore, or under other circumstances where badness of weather renders the ordinary means impracticable.

A sail of light canvas or holland (being cut to the shape, and adapted for the application of the principles of the flying kite), is launched from the vessel or other point to windward of the space over which a communication is required, and as soon as it appears to be at a sufficient distance, a very simple and efficacious mechanical apparatus is used to destroy its

poise, causing it to fall immediately, but remaining still attached by the line, and moored by a small anchor, with which it is equipped. The result of the experiments which I have made with a kite of sixty feet of surface, has been, in a strong breeze, the extension of a line weighing sixty pounds, and measuring three hundred and fifty yards in length, and one inch and three quarters in circumference; and at another time the extension of a line weighing thirty-seven pounds, and measuring eleven hundred yards in length, and five-eighths of an inch in circumference.

Being aware, as well from public documents as from my own experience of the value of expedients for the purpose in question, I am desirous of giving publicity to mine through the medium of the Society of Arts. I am prepared to exhibit the detail of the apparatus, and to illustrate its application by experiment, and if the Society of Arts shall think it worth their while to obtain a report upon it, and that report be such as to render it worth their acceptance, a pattern of it, with the necessary drawings and description shall be at their service.

I am, Sir,

To A. Aikin, Esq. &c. &c. &c.

Secretary, &c. &c. C. C. DANSEY,

Captain, Royal Artillery.

Description of a Kite and Apparatus for obtaining Communication with Vessels stranded on a Lee-shore, or otherwise where badness of Weather renders the Application of the ordinary Means impracticable.

The kite, Plate XIV, figs. 1 and 2, is a sheet of Holland, exactly 9 feet square, extended by two spars, the standard,

a a, placed diagonally, and the cross piece *b b* at right angles across it, and intersecting two sides of the square at $\frac{1}{4}$ from the angle to which one end of the diagonal spar is fixed; by this means that part of the surface of the square which is extended by the spars, forms a figure of about 55 square feet of surface, composed of two triangles, one right-angled and one isosceles; which is a very convenient shape for a kite; and the part of the square not extended operates as wings, *c c*, to steady it in its flight. At two points on the diagonal spar, about $\frac{1}{7}$ of its length from the head and the same from the bottom, two lines are attached, the upper about $\frac{1}{6}$ of the length of the kite, and the lower $\frac{1}{3}$ of its length, which, combined, form the belly-band *g g*, fig. 2; and the line which is to retain the kite is attached to the point of their junction with each other *k*, as seen in the plate; also, when the kite is large and there is much wind, as many intermediate lines as may be thought necessary to strengthen the spar may be added. The tail may be 5 or 6 times the length of the kite, and its weight must be proportionate to the wind; but if its bulk be much diffused, and so arranged as to admit of the uniform and constant action of the wind upon it, it will be displaced from that position which is most favourable for steadying the kite; and if much concentrated, it will acquire a violent vibrating motion, equally destructive of its function. The best appears to be one formed of a double cord, whipped at equal intervals with packthread, so as to form a succession of loops or eyes into which pieces of wood are thrust in order to give the requisite weight, see *f f*, fig. 2. The kite above described has, in a strong breeze, extended 1100 yards of line $\frac{5}{8}$ of an inch in circumference, and would have extended more, had it been at hand. It also extended 360 yards of line $1\frac{3}{4}$ inch in circumference, and weighing 60lbs. The Holland weighed $3\frac{1}{2}$lbs, the spars, one of

which was armed at the head with iron spikes for the purpose of mooring it, 6¾lbs., and the tail was five times its length, composed of 8lbs. of rope and 14lbs. of elm plank, weighing together 22lbs. Thus far, nothing more than the well-known property of the flying kite, and its power, developed to a greater extent perhaps than has often been practised, are involved; and to render that property and power available for the purpose in question, an apparatus has been contrived, which enables those to windward to destroy at will the poise of the kite, and cause its immediate fall, without however detaching it from the line; and those to leeward to restore its poise and effect its immediate ascent.

The apparatus now to be described is that which has been used with a kite of the above-mentioned dimensions. It consists of four parts, which for the sake of distinction, may be designated the ring, the catch, the striking bar, and the wedge, forming the apparatus *m*, fig. 2, and the messenger.

The first is a strong iron ring *o* of about 1½ inch in diameter, having four cords, 18 inches or 2 feet long, fixed at equal distances on its circumference, and all joined together at about 3 inches from the ring and attached to the kite (at the extremities of those lines which are to regulate its poise) by the others. The catch, fig. 4, is made from a piece of tough strong wood, 6 inches long and 1 inch in diameter. It has two saw-cuts at right angles to each other through half its length; there is a hole about ¼ inch in diameter, beginning in the centre of the end opposite to where the saw-cuts begin, passing about 2 inches along its axis, and then obliquely to the surface, which it meets at about ½ an inch below the end of the saw-cuts. Through this hole, the line of the kite *e* passes, and it is fixed in it, within about a fathom of the end which is the side next the saw-cuts, and so that the catch cannot slide either one way or

the other. The wedge *p*, figs. 6 and 7, is about 2 inches long, it has eight faces, and its transverse section would be a four-pointed star; it is fastened by a cord at its thick end to the cords of the ring where they meet.

To prepare the kite for its ascent, the ring is placed over that end of the catch where the saw-cuts begin (which it will be observed have divided it into four equal-sized fangs, whose inside surfaces exhibit eight faces to correspond to those of the wedge), and the wedge *p* is placed within the fangs or double cleft, which it will extend so that the ring is caught in a groove which goes round the whole circumference of the catch, and cannot be taken off again, until the wedge is removed. Therefore it appears, from the manner in which the kite has been described to be attached to the ring, the ring to the catch, and the catch to the line, that the connexion between the line and the kite is complete, but ready to be broken by the removal of the wedge, which would allow the fangs of the catch to contract, and the ring to pass over them and be disengaged. The messenger, shown in section *l*, fig. 7, is a hollow cylinder of strong wood, about 6 inches long, and its interior diameter about 1½ inch, so as to pass freely over the catch, and has a small sail rigged upon it perpendicular to its axis. When it is required to lower the kite the line is passed through the cylinder of the messenger, and the wind takes it rapidly up to the kite; when it comes upon the catch, it meets with the striking bar *n* (an edge view of which is represented fig. 5) which passes across the small end of the wedge, through one of the saw-cuts, and projects on each side about ½ an inch beyond its surface. The violence of the shock with which the messenger meets the bar, drives out the wedge, and by allowing the fangs of the catch to collapse disengages the ring. The connexion with the belly-band is thus broken, and the

cord *e* remains attached to the grapnel *d*, the ring and wedge remaining pendent from the belly-band, as *i*, fig. 1. The centre of suspension being thus transferred to the head of the kite, its rapid descent is the necessary consequence.

In the experiments that have been made with a view of gaining communication with a lee-shore, under the supposition of no assistance being there at hand, a grapnel, *d*, fig. 1, consisting of four spear-shaped iron spikes, was fixed to the head of the kite so as to moor it on its fall; and in this emergency, the attempt of some one to get on shore along the line would be the only means to be resorted to. In those cases where maintaining a correspondence after a communication was gained has been the object, the person to windward has attached a weight to the messenger, in some cases as much as three pounds, which having been carried up, has of course descended with the kite; the person to leeward has then furled the sail of the messenger, and loaded it with as much weight as the kite could lift, then replacing the ring and wedge, and exposing the surface of the kite to the direct action of the wind, it has rapidly risen, the messenger running down the line to windward during its ascent. There are a few minute points to be attended to in the construction of this apparatus, which would become so obvious in the progress of preparing it, that it would be useless to add them to a detail, already perhaps too tedious. But it is to be observed that in cases where the wind is not violent enough to take off the kite at once from the deck, or where eddies prevent its impulse from acting fairly and uniformly on its surface, the line of the kite may be passed through a snatch-block, from which another line leads through a block on some high point in the rigging, and it may thus be raised high enough for the wind to take it and clear it of the vessel.

In fig. 3, *l* is the messenger, which, after it has struck and liberated the belly-band is itself retained in the represented position by the striking bar *n*.

Fig. 8 is an end view of the ring, cylinder, and wedge, showing their mutual connexion.

In making use of Captain Dansey's Apparatus for establishing a communication between a stranded vessel and the shore, little more attention or skill is requisite than in flying an ordinary kite.

With regard to the construction of the kite the proportions established by the inventor should be carefully adhered to, particularly in the position of the cross-spar, which if placed too low will prevent the kite from rising well and flying steadily. On the contrary, when the centre of the pressure of the wind upon the surface is as much above the centre of the upright spar as can be conveniently contrived without diminishing too much the surface exposed to the wind, the best effect will be produced.

The loose portions of canvas which form the wings, may be removed or not without at all affecting the flying of the kite.

The good effect of the tail in balancing the kite will principally depend on the due proportion of its length and weight to the size of the kite and the strength of the wind.

The length and weight of the tail sufficient in a moderate breeze to keep the kite steady, and to ensure its descent when the messenger has been let off, will be inadequate in a strong wind. The best proportions are to be determined by actual experiment upon each particular kite exposed to a greater or less intensity of wind. In some cases, a single line of ten or twelve times the length of the kite, and of suitable thickness,

will succeed perfectly well; in other cases, several smaller lines united at intervals by lashing, with a single piece of board attached to the extremity of the tail, has produced an equally good effect.

In attaching the kite-line to the grapnel, a considerable portion of it should be left to hang loose, in order to prevent any derangement from taking place in the discharging apparatus. It might even be advisable to slip on a smooth metal ring of some weight.

In the apparatus laid before the Society, the inventor has placed the grapnel at the head of the kite, in which situation it performs the office of a galley-anchor, with its shank reversed. The grapnel might however be applied, with equal advantage, to the lower extremity of the kite, the points or flukes being still turned upwards. By the latter contrivance, it would perform the office of a similar anchor, with its shank in the usual position.

As the certainty of effecting the communication between the vessel and the shore depends principally on the hold which the grapnel takes in the ground, the communicating line must necessarily be attached to the head of the kite; for if it were attached to the lower extremity the whole apparatus would, in descending, take a rotatory motion, the effects of which would entirely frustrate the success of an operation which should lead to so important a result.